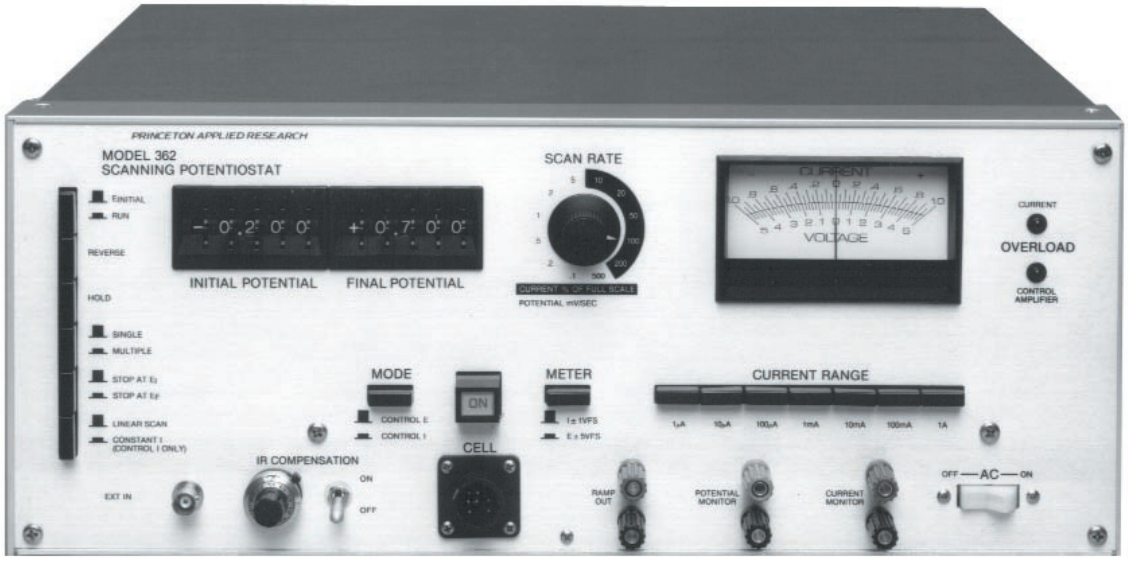
Princeton Applied Research

362
Scanning Potentiostat



The Model 362 Scanning Potentiostat provides the electrochemist with both a potentiostat/galvanostat and a versatile waveform generator at a very attractive price. The Model 362 combines accurate potential current control with a wide range of scan rates into a single instrument that will satisfy the needs of many electrochemical laboratories. The Model 362 is ideal for industrial or research applications where multiple experimental stations are desired.

The potentiostat has been designed to provide extremely stable potential control for electrochemical cells of widely varying electrical parameters. The Model 362 can be applied to systems with high-resistance electrolytes, high-resistance working electrodes (such as painted or coated metals for corrosion studies), and high surface area electrodes. Careful consideration in design has resulted in a very low-noise system, particularly important at low cell currents. Positive feedback IR compensation is provided for use in electrochemical cells with a high resistance.

The Model 362 can perform either linear sweep or cyclic voltammetry at scan rates from 0.1 mV per second to 5 V per second. Cyclic scans can be set for either single cycle or repetitive waveforms. The same variety of excitation waveforms can be applied in the controlled current mode at scan rates up to 5 A per second. The Model 362 is also ideal for battery testing since it can automatically apply constant current charge/discharge cycles between preset potential limits.

The front-panel outputs include provisions for both potential and current monitoring during an experiment. The Potential Monitor outputs a voltage that is equivalent to the potential of the reference electrode vs. the working electrode. The Ramp Out also outputs a signal equivalent to the applied potential, but at the Initial Potential, the voltage at Ramp Out is zero.

For further flexibility, a front-panel BNC connector is provided to accept externally generated waveforms.

The Model 362 is supplied with the Cell Cable Model C0168. Suggested options include:

- K0047 Corrosion Cell Kit
- K0105 Flat Specimen Holder
- K0235 Flat Cell
- Model 303A Static Mercury Drop Electrode (requires Model 407A Interface). Gold, platinum, silver and glassy carbon electrodes are available for the Model 303A.

362
Scanning Potentiostat

Potentiostat
Control Amp Output Voltage (with 30 Ω load): >±30 V.
Maximum Output Current (with 1 Ω load): 1 A.
Rise Time (10 to 90%, 1 V step):
10 kΩ Resistive Load: <10 µs
1 Ω Resistive Load: <15 µs
Frequency Response Measurements
Method A: 120 kHz (–3 dB)
Method B: 35 kHz (–3 dB)
Method A: Sine-wave current directly to I/E via a 1 kΩ load, using 1 mA current range.
Method B: Sine-wave potential applied by Model 362 across a 100 kΩ resistor, using 10 µA current range.
Drift With Time: <200 µV/week.
Drift with Temperature: <30 µV/°C + 200 ppm of Initial Potential setting per °C.
Noise & Ripple (1 Hz to 3 kHz): <200 µV rms.
Line Voltage Sensitivity (±10% change in line): <200 µV.
Stability with Capacitive Loads: Stable with reference electrode impedance <30 kΩ.
Control Amp Slew Rate: >25 V/µs.

Electrometer
Cell Voltage: ±10 V.
Input Resistance: >2 x 10^{10} Ω.
Frequency Response (–3 dB, 1 kΩ source): >1 MHz.
Drift With Time: <200 µV/week.
Drift with Temperature: <30 µV/°C.

Current Measurement and Galvanostat
Accuracy: Better than 0.4% of full scale.
Drift with Temperature: <.01% of full scale/°C.
Drift with Time: <200 µV rms.
Current Measurement Rise Time (100 µA pk-pk step; 10 to 90%): <2 µs.
Size: 43.2 cm W x 19 cm H x 38.1 cm D (17" W x 7.5" H 15" D).
Weight: 8.2 kg (18 lbs).

Scanning Parameters
$E_{INITIAL}$, E_{FINAL}:
Range: ±0 to 9.999 V
Resolution: 1 mV
Accuracy: ±3 mV. ±0.4% of setting
Vertex Accuracy: ±2 mV. ±2% of scan rate.
Scan Rate (Linear Scan):
Range: 0.1 mV/sec to 5.0 V/sec
Resolution: 1-2-5 sequence
Accuracy: ±0.1 mV/sec. ±5% of setting.

Battery Test Mode
Controlled Current Range: 10% to 200% of full-scale current.
Resolution: 1-2-5 sequence.

Control Functions
INITIAL POTENTIAL/CURRENT: Thumbwheel switch adjustable to ±9.999 V; readable to ±0.001 V and accurate to ±3 mV ±0.4% of the thumbwheel setting. Sets initial potential in potentiostatic mode or initial current in galvanostatic mode. This switch also establishes one of the potential limits for constant current battery cycling.
FINAL POTENTIAL/CURRENT: When scanning, sets the final potential or current. Not applicable unless RUN is depressed. Also establishes one of the potential limits for constant current battery cycling.
$E_{INITIAL}$/RUN: Pushbutton which selects either a fixed potential at the indicated INITIAL POTENTIAL level, or initiates a sweep or battery cycle. In CONTROL I mode, RUN applies the controlled current to the cell.
REVERSE: Pushbutton which manually reverses a linear scan or battery cycle.
HOLD: Pushbutton which interrupts a linear scan or disengages applied current in battery cycle.
SINGLE/MULTIPLE: Pushbutton which determines if repetitive waveforms (controlled E or I) or battery cycles will be executed.
STOP AT E_I/STOP AT E_F: Pushbutton which determines the potential or current at which a cycle will terminate in single cycle operation.
LINEAR SCAN/BATTERY TEST: Pushbutton which defines experiment as a voltage/current sweep or a constant current cycle between potential limits (battery test).
IR COMP: Positive feedback IR compensation.
MODE: Pushbutton which determines whether potential control or current control is maintained.
CELL: Pushbutton which controls application of current or potential to the external cell.
METER: Pushbutton which determines whether cell current or working electrode potential is displayed on the meter.
SCAN RATE/CURRENT % FULL SCALE: Establishes scan rate for linear sweep modes (scan rates on front-panel may be multiplied by ten with an internal switch). Also establishes current level when used for battery test. In this case, the selected percentag is applied to the selected CURRENT RANGE.
CURRENT RANGE: 1 µA to 1 A in decade sequence. A two-fold overrange is allowed for all ranges except the 1 A range.
METER: Allows convenient reading of cell current or working electrode potential.
EXT IN: BNC connector accepts externally applied waveforms.
EXTERNAL CELL CABLE CONNECTION
RAMP OUT: Provides an output voltage which is analogous to the ramp in linear scan mode. The output is independent of initial potential or initial current setting.
POTENTIAL MONITOR: Provides a voltage equivalent to the reference electrode potential with repsect to the working electrode potential.
CURRENT MONITOR: Provides an output which is proportional to the cell current. Full scale current corresponds to 1 V.
CURRENT OVERLOAD: Indicates a cell current which exceeds two times the selected current range.
POTENTIAL OVERLOAD: Indicates a compliance voltage in excess of ±30 V.
AC: Power on/off switch.

Specifications subject to change
021703

Princeton Applied Research
info@pari-online.com • www.princetonappliedresearch.com
801 South Illinois Avenue, Oak Ridge, TN 37831-0895 U.S.A.
(800) 366-2741 or (865) 482-4411 • Fax (865) 483-0396
For International Office Locations, Visit Our Website
AMETEK ADVANCED MEASUREMENT TECHNOLOGY